REMARKS

This application has been reviewed in light of the Office Action dated January 29, 2007.

Claims 1-35 are now presented for examination. Claims 1 and 2 have been amended to more particularly point out and distinctly claim the subject matter regarded as the invention. Claim 35 has been added. Claims 1, 30 and 35 are independent. Favorable review is respectfully requested.

Claims 1-29 were rejected under 35 U.S.C. § 101 as reciting non-statutory subject matter. The Examiner stated that the invention was not limited to a substantial practical application, and that if an optimized database were not employed in some fashion, it would be deemed an exercise only, without practical application.

Independent claim 1 has again been carefully reviewed and revised in light of the Examiner's comments. The claim has been amended to explicitly recite: (1) that the method is for performing a supervised learning process including optimizing a database for the training and testing of a prediction algorithm for predicting the presence or absence of a specified medical condition in a patient; (2) a step of using the distribution of database records associated with a selected prediction algorithm in performing supervised learning, said supervised learning including training and testing of prediction algorithms to obtain a trained prediction algorithm; and (3) that the trained prediction algorithm is effective to predict output variables for data relating to the medical condition, thereby predicting diagnosis of the condition. Support for this amended claim language is clearly stated in the specification, at least in paragraphs 75, 114, 120 and 123. It is respectfully submitted that amended claim 1 (along with claims 2-29 dependent therefrom) recites statutory subject matter.

New claim 35 also recites a method for performing a supervised learning process in an artificial intelligence environment, including optimizing a database of sample records. This optimizing is for the training and testing of a prediction algorithm for a problem under investigation characterized by input variables and output variables. The prediction algorithm is used for predicting output variables for real world data. Claim 35 explicitly recites a step of using the trained prediction algorithm to predict the output variables relating to the problem under investigation where only the input variables are known. This claim limitation is

supported in the specification at least in paragraphs 75 and 90. Since the method of claim 35 includes training of a prediction algorithm, and the result is a prediction of output variables relating to the problem under investigation where only the input variables are known, it is submitted that claim 35 also recites statutory subject matter under 35 U.S.C. § 101.

Claim 2 was rejected under 35 U.S.C. § 112, second paragraph. The Examiner stated that the term "pseudo-random" rendered the claim indefinite, as this term was not clearly defined or an accepted term in the art. In response to the Examiner's comments, claim 2 has been amended to recite that each different distribution of the records of the data set is created as one of a random distribution and a distribution formed by a deterministic mathematical process characterized as a pseudorandom distribution. Each of the recited distributions is thus either (1) random, or (2) formed by a deterministic mathematical process. A distribution formed by such a deterministic mathematical process is characterized as "pseudorandom," consistent with the meaning of this term in the mathematical and programming art. It is earnestly believed that all of the claims are in compliance with 35 U.S.C. § 112.

Claims 1-14 and 21-25 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Lapointe et al. (U.S. Patent Application Publication 2003/0004906) in view of Arouh et al. (U.S. Patent Application Publication 2002/0077756). The applicant respectfully submits that amended claim 1 is patentable over the art cited by the Examiner, for the following reasons.

The present invention, as defined in claim 1, is directed to a method including the step of defining one or more distributions of database records onto respective training and testing subsets; using this defined set to train and test a first generation set of prediction algorithms; and feeding those prediction algorithms to an evolutionary algorithm which generates a set of second generation algorithms. In addition, claim 1 recites that a fitness score is assigned to each generated prediction algorithm.

Lapointe et al. is understood to disclose a method in which a set of data is partitioned into training and testing files (paragraph 91), and training of neural networks using training partitions. Lapointe et al. does not mention generations of prediction algorithms (or generations of networks), and does not disclose or suggest an evolutionary algorithm or assigning a fitness score, as recited in claim 1. As noted by the Examiner (Office Action, page 5), Lapointe et al. does not disclose or suggest an evolutionary algorithm which

generates a set of one or more second generation prediction algorithms and assigns a fitness score to each.

Furthermore, Lapointe et al. does not disclose or suggest using a fitness score as a criterion for a termination event in an evolutionary process. Since Lapointe et al. does not suggest an evolutionary algorithm, it follows that Lapointe et al. cannot suggest a selected prediction algorithm having a best fitness score, and thus cannot suggest using a distribution of records associated therewith in performing supervised learning as required by claim 1.

Arouh et al. is understood to disclose a method for construction and training of neural networks which may involve a "genetic algorithm" (Arouh et al., paragraph 226 and Figure 1E). Even if the evolutionary algorithm of claim 1 were regarded as equivalent to the genetic algorithm of Arouh et al. (a point not conceded), Arouh et al. fails to teach the evolutionary algorithm of claim 1 or the use thereof. Arouh et al. does not offer details of a selection of a prediction algorithm (or neural network) by a genetic algorithm. It is noteworthy that in Figure 1E of Arouh et al., the genetic algorithm stops when a "stopping criterion" is satisfied. Even if "stopping criterion satisfied" were interpreted as "select a neural network with required fitness score" (a point also not conceded), Arouh et al. does not suggest using a distribution of database records associated with the selected neural network in performing supervised learning, as required by claim 1. Arouh et al. teaches training a neural network by limiting the inputs to that network by statistical processes (paragraphs 117-125). Arouh et al. makes it clear that the amount of input data is to be reduced, but does not suggest defining distributions of database records, let alone using such distributions in supervised learning as required by claim 1.

Moreover, Lapointe et al. does not suggest the desirability of using an evolutionary algorithm. It is respectfully submitted that the motivation to combine Lapointe et al. with Arouh et al. does not appear in the references. One reading Lapointe et al., without the benefit of impermissible hindsight, would not have been motivated to discard Lapointe et al.'s "consensus of networks" in favor of a "selected prediction algorithm" obtained by an evolutionary algorithm as in claim 1.

Even if the teachings Lapointe et al. and Arouh et al. were combined, that combination would not meet the requirements of claim 1. Supposing that a neural network of Arouh et al. were obtained by a genetic algorithm; and supposing that such a network were selected as

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having a best fitness score (not taught or suggested in either reference); and supposing that this selected network were to be trained, there is still no suggestion in either reference, or in their combination, of using a distribution of database records in performing supervised learning. Arouh et al. might be read to suggest that a reduced database is desirable, while Lapointe et al. teaches training using partitioned data. Neither reference suggests supervised learning using a distribution of database records as recited in claim 1.

Accordingly, it is believed that neither Lapointe et al. nor Arouh et al., considered alone or in combination, renders obvious the method of independent claim 1.

Claims 15-17, indirectly dependent from claim 1, were rejected under 35 U.S.C. § 103(a) as being unpatentable over Lapointe et al. and Arouh et al. in view of Boden (U.S. Pat. No. 5,708,774). The applicant respectfully submits that amended claim 15 is patentable over the cited art, for the following reasons.

Claims 15-17 all directly depend from claim 14 and incorporates all of the features of claim 14. Claims 15-17 thus characterize the evolutionary algorithm as a genetic algorithm with certain evolutionary rules. One of these rules is that individuals having a fitness value lower or equal to the average health of the entire population are not excluded from the creation of new generations but are marked out and entered in a vulnerability list.

As noted above, Lapointe et al. does not suggest using an evolutionary algorithm (whether or not characterized as a genetic algorithm), and in particular does not suggest a fitness function used with an evolutionary algorithm. Furthermore, since it is concerned with a 'consensus network' with an averaged performance estimate, Lapointe et al. does not suggest the desirability of assigning a fitness value to an algorithm, let alone using that fitness value as a criterion in an evolutionary algorithm. Lapointe et al. thus does not provide motivation for a combination with either Arouh et al. or Boden regarding a fitness value. MPEP § 2143.01.

Furthermore, Boden is understood to disclose automated testing software including a "fitness function" for evaluating individual call sequences (col. 5, line 66, to col. 6, line 15). Boden teaches (col. 6, lines 8-15) that succeeding generations are chosen based on the fitness function, and states that "individuals of low fitness value may not be selected at all." Boden therefore does not teach or suggest that individuals having a fitness value lower or equal to

the average health of the entire population are marked out and entered in a vulnerability list, as required by claims 15-17.

A combination of Lapointe et al. and Arouh et al. with Boden (even if properly motivated, a point not conceded) would at best yield an evaluation scheme in which a fitness function is executed, and individuals with a below-average fitness evaluation would not be selected for the next generation. Neither of the cited references, nor a combination thereof, suggests that individuals having a fitness value lower or equal to the average health of the entire population be not excluded from the creation of new generations but rather marked out and entered in a vulnerability list. Accordingly, claims 15-17 would not have been obvious from either of the references, or from a combination thereof.

Claims 18-20, dependent from claim 14 (and indirectly from claim 1), were rejected under 35 U.S.C. § 103(a) as being unpatentable over Lapointe et al., Arouh et al., and Boden in view of Burke et al. ("A Genetic Algorithms Tutorial Tool for Numerical Function Optimisation"). Burke et al. is understood to provide a basic teaching regarding genetic algorithms. Burke et al. does not teach or suggest the above-noted limitations of claim 1 regarding using a distribution of database records associated with a selected prediction algorithm, as recited in claim 1. Furthermore, Burke et al. does not teach or suggest the above-noted limitations of claim 14 regarding generations marked out and placed on a vulnerability list. Accordingly, Burke et al. does not remedy the defects in Lapointe et al., Arouh et al, and Boden as references against the invention defined in claims 18-20. Claims 18-20 therefore would not have been obvious from the cited references.

Claims 26-29, dependent from claim 25 (and indirectly from claim 1), were rejected under 35 U.S.C. § 103(a) as being unpatentable over Lapointe et al. and Arouh et al. in view of either or both of Rose (U.S. Patent Application Publication No. 2002/0178132) and Breed (U.S. Patent Application Publication No. 2003/0002690). Rose is understood to disclose an adaptive signal recognition system using a reiterative algorithm. Breed is understood to disclose a system employing sensors and transducers for determining the status of a person inside a vehicle. Neither of these references discloses or suggests a method including distribution of database records, an evolutionary algorithm, or using a distribution of database records associated with a selected prediction algorithm in supervised learning, as recited in claim 1. It follows that neither references discloses or suggests a system for carrying out this

method, as recited in claim 25. Accordingly, neither Rose nor Breed remedies the above-noted defects of Lapointe et al. and Arouh et al. as references against the inventions defined in claims 26-29. Claims 26-29 therefore would not have been obvious from the cited references.

Claims 30-34 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Lapointe et al. and Arouh et al. in view of Kwok et al. (U.S. Pat. No. 6,177,249). The applicant respectfully submits that claim 30 is patentable over the cited art, for the following reasons.

Claim 30 is directed to a method for producing a microarray for genotyping operations, including the steps of providing a database of experimentally determined data; dividing the database into a training and a testing dataset for training and testing a prediction algorithm; defining two or more different training datasets; training and testing the prediction algorithm with each of the different training sets and the associated testing set; calculating a fitness score or prediction accuracy of each algorithm; and providing an evolutionary algorithm. As discussed above, Lapointe et al. does not disclose or suggest calculating a fitness score or prediction accuracy, and does not provide an evolutionary algorithm as recited in claim 30. In addition, as discussed above, Arouh et al. does not suggest calculating a fitness score as required by the claim. Furthermore, Lapointe et al. does not provide the required motivation for combination with Arouh et al. to obtain a reference against the invention defined in claim 30.

Kwok et al. is understood to disclose a method of detecting a nucleotide or sequence of nucleotides; Kwok et al. does not disclose or suggest defining datasets, training and testing prediction algorithms, or providing an evolutionary algorithm. In particular, Kwok et al. does not suggest calculating a fitness score as recited in claim 30. Furthermore, Kwok et al. does not suggest repeatedly applying an evolutionary algorithm until a predetermined fitness score has been reached. It follows that Kwok et al. cannot remedy the above-noted defects of Lapointe et al. or Arouh et al. as a reference against the invention defined in claim 30. The features of claim 30 described just above would not have been obvious from either of the references, or from a combination of them.

The other claims in this application are dependent from one or the other of the independent claims discussed above and are believed to be patentable for the same reasons.

Since each dependent claim is deemed to define an additional aspect of the invention, however, the consideration of each claim on its merits is respectfully requested.

In view of the foregoing amendments and remarks, favorable consideration and early passage to issue of the application are respectfully requested.

The Commissioner is hereby authorized to charge any fees which may be required for this Amendment, or credit any overpayment, to Deposit Account No. 50-1561 of Greenberg Traurig, LLP.

In the event that an extension of time is required to make this Amendment timely filed, the Commissioner is requested to grant a petition for that extension of time required to make the Amendment timely, and is hereby authorized to charge any fee for such an extension of time, or credit any overpayment, to Deposit Account No. 50-1561 of Greenberg Traurig, LLP.

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Date: April 23, 2007